Federal Democratic
Republic of Ethiopia

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ET ISO 15822 (2007) (English): Test method of doorset opening performance in diagonal deformation -- Seismic aspects

ISO INSIDE

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ETHIOPIAN STANDARD

ES ISO 15822:2012

First edition

Test method of doorset opening performance in diagonal deformation — Seismic aspects

Identical with ISO 15822:2007

ICS: 91.060.50

Published by Ethiopian Standards Agency
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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Building structures and elements of building (TC 41) and published by the Ethiopian Standards Agency (ESA).

The standard is identical with ISO 15822:2007 Test method of doorset opening performance in diagonal deformation — Seismic aspects published by International organization for Standards (ISO).

For the purpose of this Ethiopian Standard , the adopted text shall be modified as follows.
- The phrase “International Standard” shall be read as “Ethiopian Standard”; and
- A full stop (.) shall substitute comma (,) as decimal marker.

Test method of doorset opening performance in diagonal deformation — Seismic aspects

1 Scope

This International Standard specifies the test method for evaluating the opening function of single-leaf doorset under in-plane diagonal deformation by in-plane static load.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1804, *Doors — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1804 and the following apply.

3.1
in-plane displacement
ratio of difference in amounts of horizontal movements of upper and lower ends to the distance between the vertical measuring points

NOTE In-plane displacement is designated in units of radians.

3.2
opening force
force applied to open the door leaf

3.3
unlocking torque value
force, in torque value, applied to unlock the doorset

4 Principle

The doorset is forced to deform by a static load being gradually applied, and the force necessary to open and unlock the door under such diagonal deformation is measured.

5 Test specimen

The test specimen shall be constructed and installed in operating conditions equivalent to normal and practical use.

If the test specimen contains a glazed area, it shall comply with the requirements of the manufacturer. In case no glass thickness has been specified, the test shall be carried out with the minimum glass thickness specified in the specification.

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6 Test apparatus

6.1 Test rig

The test rig shall be a structure where the test specimen can be installed, as shown in Figure 1, in accordance with the manufacturer's specification and the codes of practice. The rig frame shall be sufficiently stiff and rigid to withstand the force applied during the test, and shall be assembled in pin-joint. The details of joints are shown in Figures 2 a) and 2 b).

6.2 Device to apply the force

The device to apply the force shall be able to apply a static force to the test rig to produce diagonal deformation. The force is applied to either the upper or the lower horizontal rig frame. When regarded as a positive force, the force is applied in the direction from the lock side to the hinge side; when regarded as negative force, it is applied in the opposite direction.

6.3 Device to measure the displacement

The device to measure the displacement shall be able to measure the horizontal displacement at measuring points 1 and 2 and vertical displacement at points 3 and 4, as shown in Figure 3. The measuring points shall be 100 mm outside the test rig.

6.4 Device to measure the opening force

The device to measure the opening force shall be able to measure the necessary force, which is applied to the door handle by a pushing or pulling operation, to open the doorset.

6.5 Device to measure the unlocking torque

The device to measure the unlocking torque shall be able to measure the torque value necessary to unlock the doorset by turning the handle or knob.

7 Test procedure

7.1 Installation of the test specimen

The test specimen shall be installed and secured horizontally and vertically, without twists and bends.

7.2 Procedure

7.2.1 The test shall be conducted according to the following procedure from 7.2.2 through 7.2.8.

7.2.2 Check that the door leaf can operate normally and make sure that the doorset can be locked.

7.2.3 Install the displacement measuring device as shown in Figure 2.

7.2.4 Confirm the initial “zero” position of displacement measuring devices.

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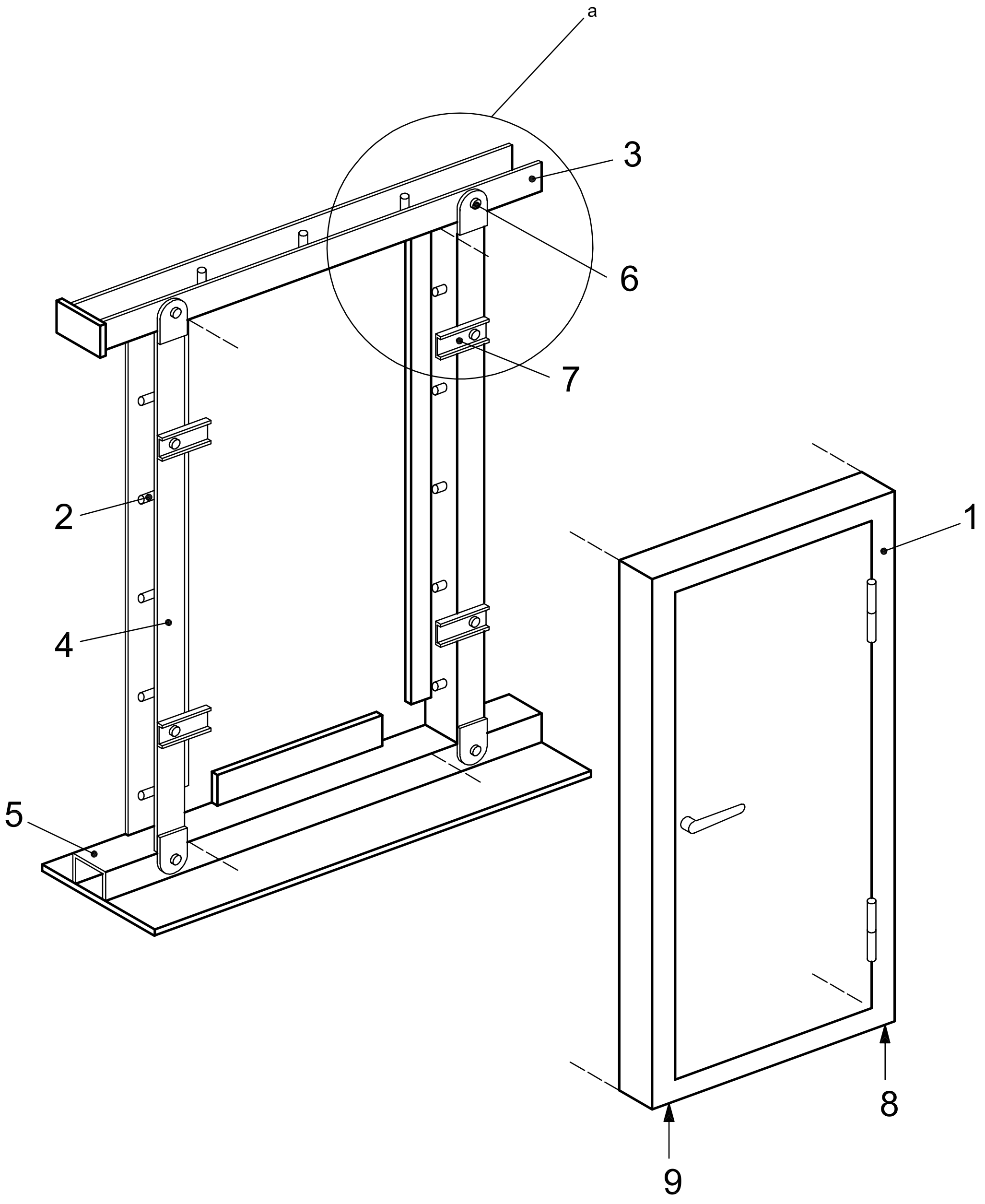
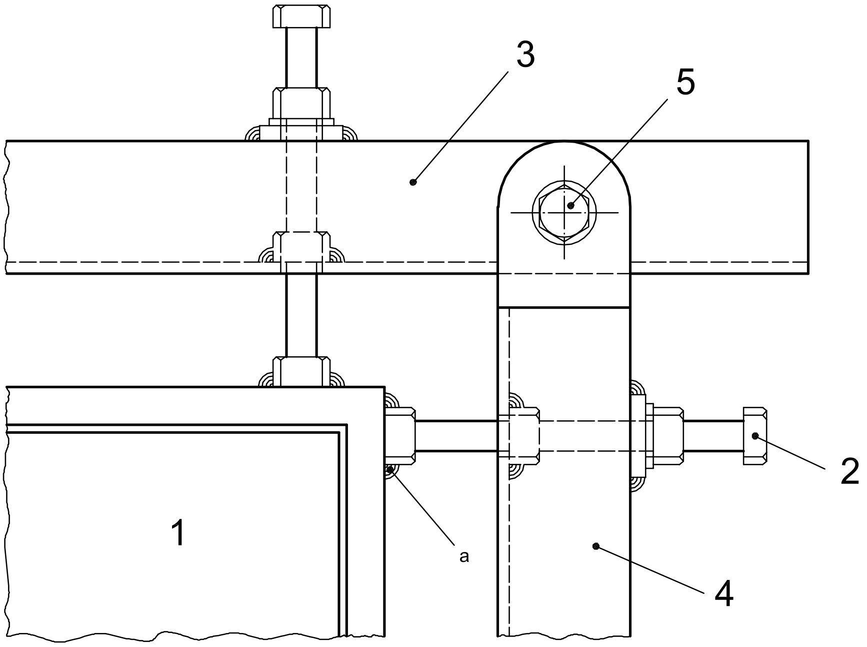


Key

1	test specimen
2	device to secure test specimen in the frame
3	upper horizontal rig frame
4	vertical rig frame
5	lower horizontal rig frame
6	pin joint (pin support)
7	guide
8	hinge side
9	lock side

[a] See Figures 2 a) and 2 b).

Figure 1 — Example of test rig



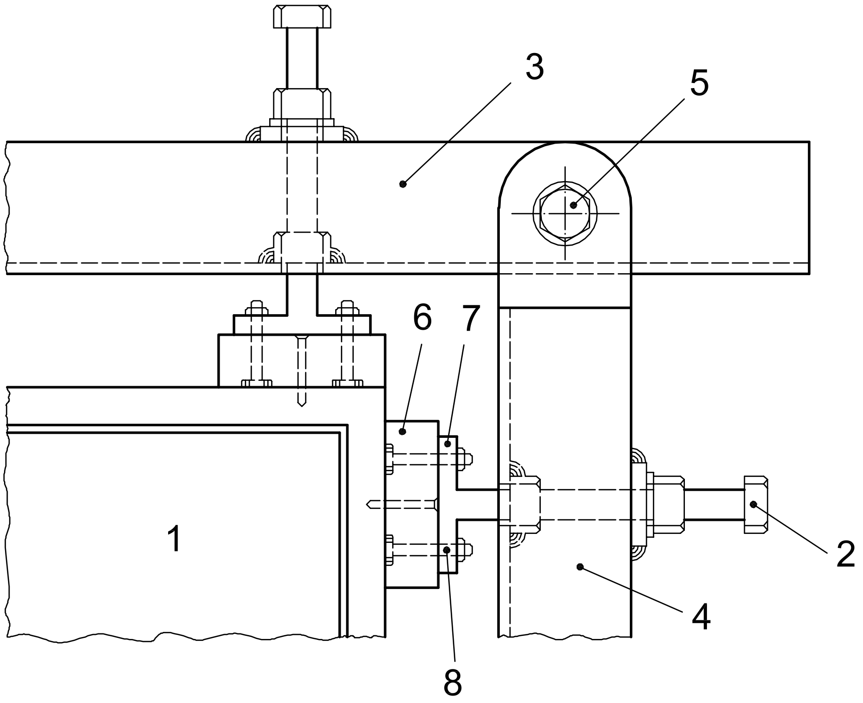
Key

1	test specimen
2	device to secure test specimen in the frame
3	upper horizontal rig frame
4	vertical rig frame
5	pin joint (pin support)

[a] Weld.

a) Example of test specimen secured by welding

Figure 2 — Methods of securing the test specimen in the frame



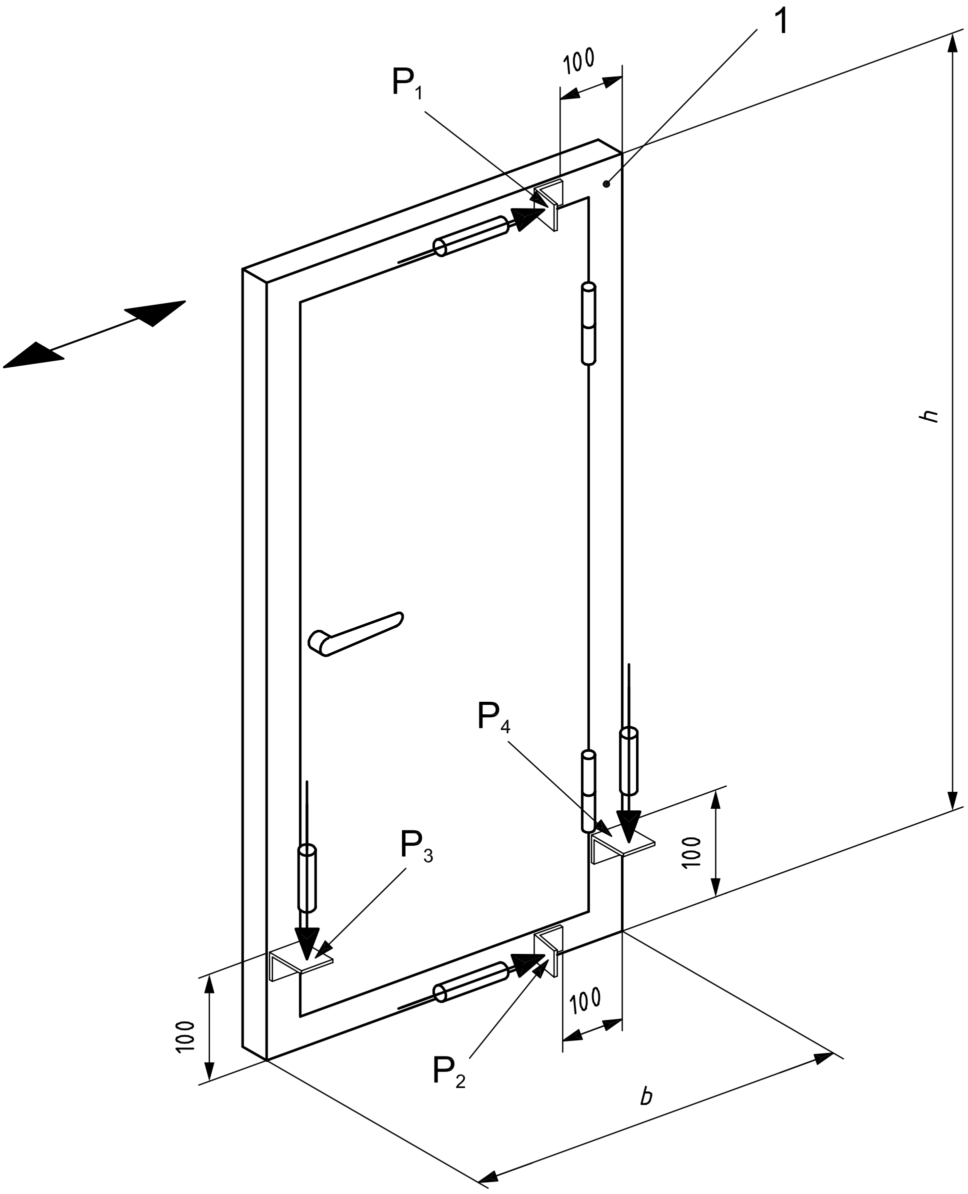
Key

1	test specimen
2	device to secure test specimen in the frame
3	upper horizontal rig frame
4	vertical rig frame
5	pin joint (pin support)
6	backing (chip board)
7	steel plate
8	screw

b) Example of test specimen secured by screws

Figure 2 — Methods of securing the test specimen in the frame *(continued)*

Dimensions in millimetres



Key

1	door frame
P_1	measuring point 1
P_2	measuring point 2
P_3	measuring point 3
P_4	measuring point 4
h	distance between measuring points 1 and 2, expressed in millimetres
b	distance between measuring points 3 and 4, expressed in millimetres

Figure 3 — Example of displacement measuring points

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7.2.5 Apply the required force for in-plane displacement and repeat this procedure three times, then increase it by steps from smaller to larger displacements.

The in-plane displacement, R, shall be determined by eight steps:

$\pm 1/400, \pm 1/300, \pm 1/200, \pm 1/150, \pm 1/120, \pm 1/90, \pm 1/75$ and $\pm\ 1/60$.

However, in case steps other than the above are required, their values shall be agreed by the parties involved.

In the case of steps being specified by the parties involved, the test may be conducted from the two steps preceding the specified step.

The in-plane displacement, R, expressed in radians, is defined by the Equation (1):

$$R = \frac{\delta_1 - \delta_2}{h} - \frac{\delta_3 - \delta_4}{b} \tag{1}$$

where

δ_1 is the horizontal displacement at measuring point 1, expressed in millimetres;

δ_2 is the horizontal displacement at measuring point 2, expressed in millimetres;

δ_3 is the vertical displacement at measuring point 3, expressed in millimetres;

δ_4 is the vertical displacement at measuring point 4, expressed in millimetres;

h is the distance between the points 1 and 2, expressed in millimetres;

b is the distance between the points 3 and 4, expressed in millimetres.

7.2.6 Observe visually any bend, indentation or damage at the first and third deformation cycle of each step.

7.2.7 Measure and record the values of the unlocking torque value, to 0,1 N, and the opening force, to 10 N, at the first and third deformation cycle of each step, in accordance with Figures 4 and 5.

7.2.8 Complete the test when

a) either any failure in operating the doorset or any damage makes it impossible to continue the test,

b) or the specified number of cycles has been carried out.

8 Expression of results

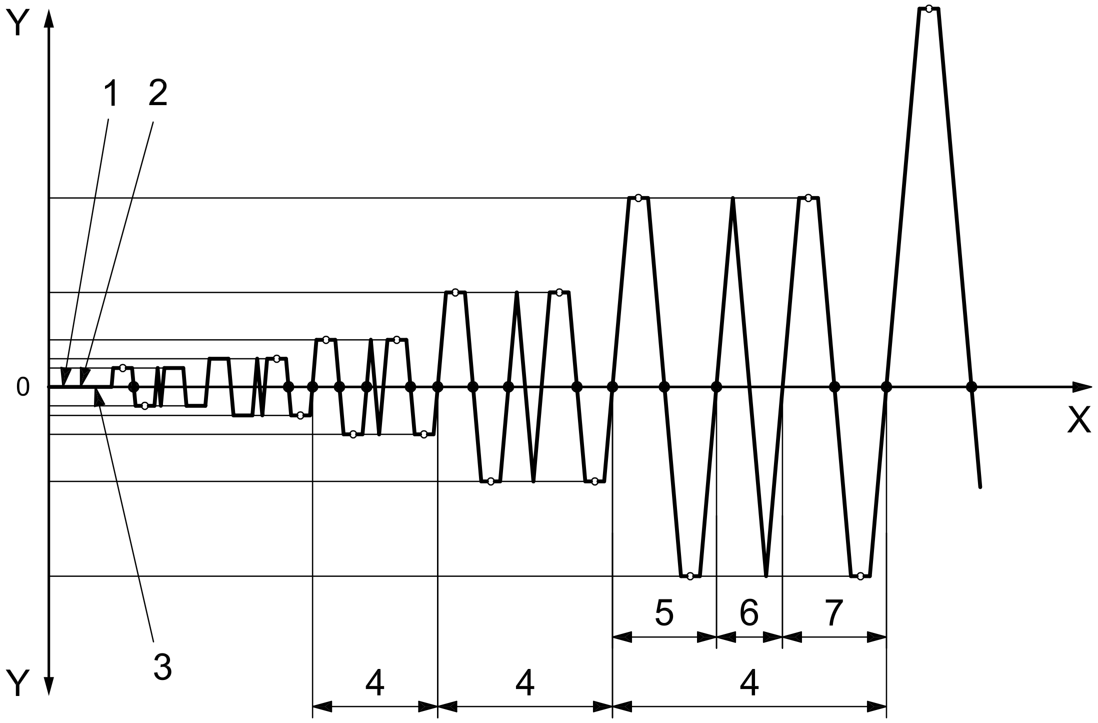
The following test results shall be recorded at each step:

a) in-plane displacement;

b) maximum unlocking torque value;

c) maximum opening force;

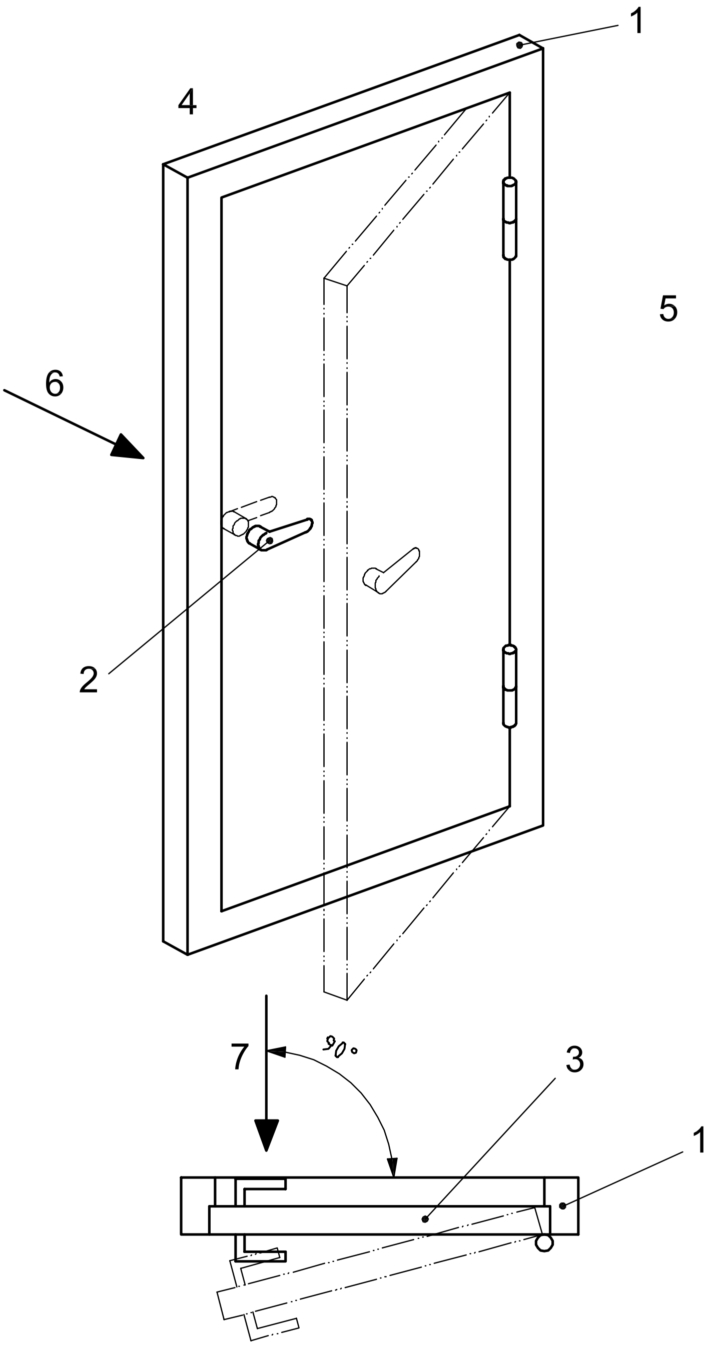
d) locations and degree of deformation, damage or deterioration of the test specimen during the test, including abnormality of hardware.



Key

X	time, expressed in seconds
Y	in-plane displacement, R
1	confirmation of door actuation
2	mounting measuring device
3	confirmation of initial settings
4	deformation step
5	first deformation, second deformation cycle
6	second deformation step, second deformation cycle
7	third deformation, second deformation cycle
o	Maintaining the force applied to the test specimen, perform the procedures in 7.2.6 and 7.2.7
●	The door leaf is closed and locked

Figure 4 — Chart of force application to deform

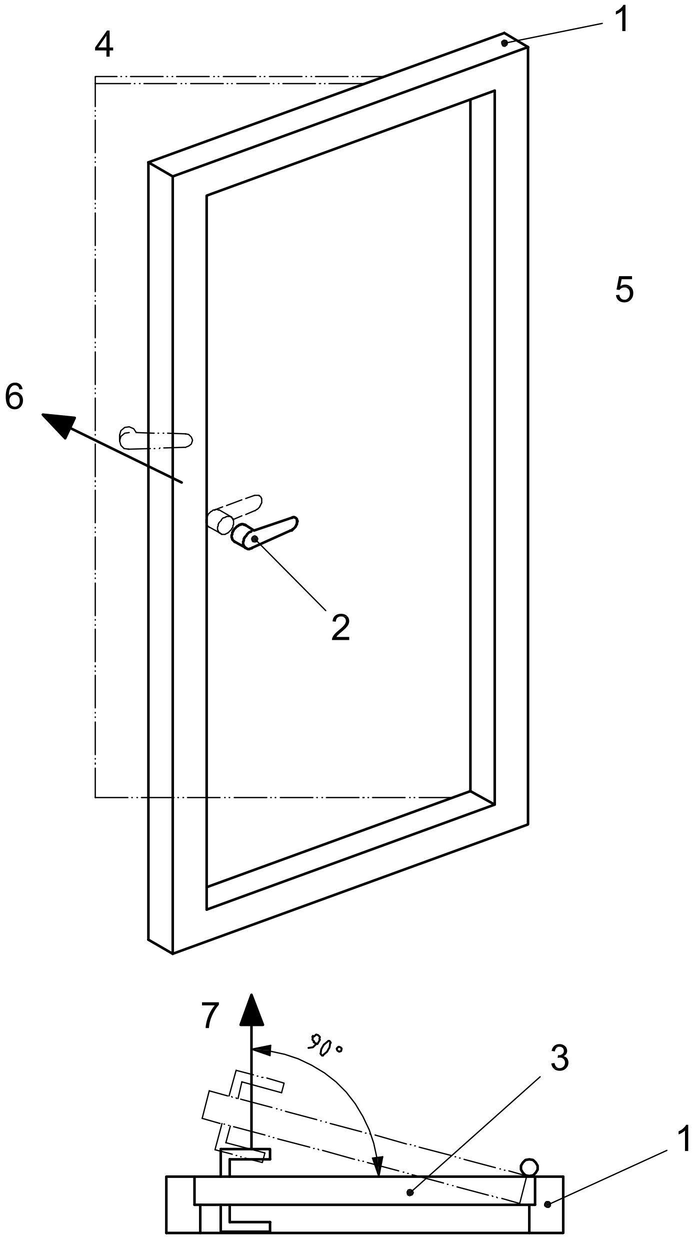


Key

1	doorframe
2	knob or handle
3	single leaf door
4	indoors
5	outdoors
6	pulling force applied from indoors at right angles
7	pulling force applied from outdoors at right angles

a) For an outward door

Figure 5 — Position of device to measure the opening force



Key

1	doorframe
2	knob or handle
3	single leaf door
4	indoors
5	outdoors
6	pulling force applied from indoors at right angles
7	pulling force applied from outdoors at right angles

b) For an inward door

Figure 5 — Position of device to measure the opening force *(continued)*

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9 Test report

The test report shall contain the following information:

a) designation, type, dimensions, detailed drawings and necessary references to identify the test specimen;

b) synopsis of test equipment and mounting method of test specimen;

c) test results as specified in Clause 8;

d) name(s) of testing organization and of person in charge, and date of test;

e) any other information recognized as impacting the test results.

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Ethiopian Standards Agency

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- Facilitate the country's technology transfer through the use of standards,
- Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

More Information?
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